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SCIENCE AND ITS METHODS.*

THE first man, when he had day after day even for a single week witnessed the rising and the setting of the sun, the former having invariably been accompanied by the presence of light, while the latter had as invariably been followed by its absence, had thus acquired the first rude elements of positive knowledge, or science. The cause—the sun's rising—being given it would have been beyond his power to conceive that the effect should not follow. With further observation he learned to remark that at certain seasons of the year the luminary appeared to traverse particular portions of the heavens, that then it was always warm, and the trees put forth leaves to be followed by fruit; whereas, at others, it appeared to occupy other portions of the heavens, the fruit then disappearing and the leaves falling, as a prelude to the winter's cold. Here was a further addition to his stock of knowledge, bringing with it foresight, and a feeling of the necessity for action. If he would live during the season of cold he could do so only by preparing for it during the season of heat, a principle as thoroughly understood by the wandering

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Esquimaux of the shores of the Arctic ocean, as by the most enlightened and eminent philosopher of Europe or America. †

Earliest among the ideas of such a man would be those of space, quantity and form. The sun was obviously very remote, while of the trees some were distant and others were close at hand. The moon was single, while the stars were countless. The tree was tall, while the shrub was short. The hills were high, and tending toward a point, the plains being low and flat. We have here the most abstract, simple and obvious of all conceptions. The idea of space is the same whether we regard the distance between the sun and the stars by which he is surrounded, or that between the mountains and ourselves. So, too, with number and form, which apply to the sands of the sea-shore as readily as to the gigantic trees of the forest, or to the various bodies seen to be moving through the heavens.

Next in order would come the desire, or the necessity, for comparing distances, numbers and magnitudes, the means for this being at hand in machinery supplied by nature, and always at his command. His finger, or his arm, would supply a measure of magnitudes, his pace doing the same by distance; and the standard with which he would compare the weights would be found in

† "These facts, that science and the positive knowledge of the uncultured cannot be separated in nature, and that the one is but a perfected and extended form of the other, must necessarily underlie the whole theory of science, its progress, and the relations of its parts to each other. There must be serious incompleteness in any history of the sciences which, leaving out of view the first steps of their genesis, commences with them only when they assume definite forms. There must be grave defects, if not a general untruth, in a philosophy of the sciences considered in their interdependence and development, which neglects the inquiry how they came to be distinct sciences, and how they were severally evolved out of the chaos of primitive ideas. * * * Is not science a growth? Has not science, too, its embryology? And must not the neglect of its embryology lead to a misunderstanding of the principles of its evolution and of its existing organization? There are *à priori* reasons, therefore, for doubting the truth of all philosophies of the sciences which tacitly proceed upon the common notion that scientific knowledge and ordinary knowledge are separate; instead of commencing, as they should, by affiliating the one upon the other, and showing how it gradually came to be distinguishable from the other. We may expect to find their generalizations essentially artificial, and we shall not be deceived."—HERBERT SPENCER, *Genesis of Science.*

some one among the most ordinary commodities by which he was surrounded. In numerous cases, however, distances, velocities, or dimensions proving to be beyond the reach of direct measurement, there is thus produced a necessity for devising means of comparing distant and unknown quantities with those that being near can be ascertained; and hence arises mathematics, or The Science—so denominated by the Greeks, because to its aid was due nearly all the positive knowledge of which they were possessed.

The multiplication table enables the plowman to determine the number of days contained in a given number of weeks, and the merchant to calculate the number of pounds contained in his cargo of cotton. By help of his rule, the carpenter determines the distance between the ends of the plank on which he works. The sounding-line enables the sailor to ascertain the depth of water around his ship, and by aid of the barometer the traveler determines the height of the mountain on which he stands. All these are *iustruments* for facilitating the acquisition of knowledge; such, too, being the formulæ of mathematics by help of which the philosopher determines the magnitude and weight of bodies distant from him millions of millions of miles, and is thus enabled to solve innumerable questions of the highest interest to man. They are the key to science, but are not to be confounded with science itself, although often included in the list of sciences, and even so recently as in M. Comte's well-known work. That such should ever have been the case has been due to the fact that so much of what is really physics is discussed under the head of mathematics: as is the case with the great laws for whose discovery we are indebted to Kepler, Galileo and Newton. That a body impelled by a single force will move in a right line and with a velocity that is invariable, and that action and reaction are equal and opposite, are facts at the knowledge of which we have arrived in consequence of pursuing a certain mode of investigation; but when obtained, they are purely physical facts, obtained by help of the instrument to which we apply the term mathematics—and which is, to use the words of M. Comte, simply "an immense extension of natural logic to a certain order of deductions."*

* *Positive Philosophy*, Martineau's Translation, vol. i. p. 33.

Logic is itself, however, but another of the instruments devised by man for enabling him to obtain a knowledge of nature's laws. To his eyes the earth appears to be a plane, yet does he see the sun rising daily in the east and setting as regularly in the west, from which he might infer that it would always continue so to do; but of this he can feel no certainty until he has satisfied himself why it is that it does so rise and set. At one time seeing the sun to be eclipsed, while at another the moon ceases to give light, he desires to know why such things are—what is the law governing the movements of those bodies; having obtained which he is enabled to predict when they will again cease to give light, and to determine when they must have done so in times that are past. At one moment ice or salt melts; at another gas explodes; at a third, walls are shattered and cities are hurled to the ground; and he seeks to know why these things are—what is the relation of cause and effect? In the effort to obtain answers to all these questions he observes and records facts, then arranging them with a view to determining the laws by virtue of which they occur—and he invents barometers, thermometers and other instruments to aid him in his observations, but the ultimate object of all is that of obtaining an answer to the questions: Why are all these things? Why is it that dew falls on one day and not on another; Why is it that corn grows abundantly in this field and fails altogether in that other? Why is it that coal burns and granite will not? What, in a word, are the laws instituted by the Creator for the government of matter. The answers to these questions constitute science—and mathematics, logic, and all other of the machinery in use, are but instruments used by him for the purpose of obtaining them.

Discussing the subject of rational mechanics under the head of mathematics, M. Comte informs his readers that we here "encounter a perpetual confusion between the abstract and the concrete points of view; between the logical and the physical; between the artificial conceptions necessary to help as to general laws of equilibrium and motion, and the natural facts furnished by observation, which must form the basis of the science."* This, however, is only saying that as "the natural facts," furnished by observation, increase in number, there arises a neces-

**Positive Philosophy*, Martineau's Translation, vol. i. p. 107.

sity for endeavoring to perfect the machinery by help of which they are to be studied; and that such is the case in the instance here referred to is shown in M. Comte's admission that the science of which he treats is "founded on some general facts, furnished by observation, of which we can give no explanation whatever."* Passing from gate to gate of science we pass from simple to compound locks, requiring additional wards in the keys by which they are to be opened; but the key still remains a key, and can never become a lock, even though the wards become fifty-fold more numerous than those of any yet constructed by Bramah, Chubb or Hobbs, and require years of study for acquiring its proper management. There arises then what may be called the science of the key, but it constitutes no part of natural science. When D'Alembert made, to use the words of Comte, "a discovery, by help of which all investigation of the motion of any body or system might be converted at once into a question of equilibrium," he merely opened a new ward in the key by which we were to unlock the cabinet of nature, and thus enlarge the boundaries of that department of knowledge which treats of the properties of matter and the laws by which it is governed, and known as physical science.

§ 2. Abstract mathematics necessarily took precedence of the more concrete physics, because they were the sole product of logic, and dependent upon those first principles which are in their elements so nearly intuitive that when a boy commences the study of geometry he finds that he had already acquired a knowledge of much that is now being given to him as a science. Hence, too, it was that moral science, poetry, the fine arts, and metaphysics were so far advanced in Greece, while mechanical science had scarcely an existence.

In default of observation, men of speculative habits looked inward to their own minds and invented theories that were given to the world as laws, but, as has well been said: "Man can *invent* nothing in science or religion but falsehood, and all the truths that he *discovers* are but facts or laws that have emanated from the Creator." The men of the Middle Ages—the philosophers of the schools—taught the theories that had been invented by their Grecian predecessors, leaving it for Bacon to teach the philosophy

* *Positive Philosophy*, Martineau's Translation, vol. i. p. 117.

that leads to the search for truth among the facts of nature and not among the speculations of men. From his day to the present there has been a perpetual tendence toward the substitution of careful observation and induction for the dreams of theorists, and as the Cartesian doctrine of Vortices gave way to the discovery of gravitation, so the imaginary phlogiston of Stahl, and the Plutonian and Neptunian cosmogonies have yielded to the discoveries of modern science. The former was early displaced by the oxygen of Lavoisier, while the latter held their ground until disproved by the observations of geologists, whose branch of science dates its existence but little beyond the present century.

In physics, the more abstract and general has in its development tended to take precedence of that which is concrete and special, both, however, moving gradually onward, each aiding and aided by the other. Astronomy, the science of the laws governing bodies exterior to our own planet, was studied at an early period, the shepherds of Chaldea having carefully noted the movements of the celestial bodies, and Babylonians having calculated eclipses thousands of years before the commencement of the Christian era. From a well in Syene Eratosthenes obtained the observations required for determining the terrestrial meridian; and many centuries before Copernicus, Archimedes taught the double motion of the earth around its axis and around the sun. The precise length of the solar year was determined by Hipparchus, corresponding within ten minutes with the figures obtained by both Mexican and Etrurian observations.

The motions of the celestial bodies were thus early studied and comprehended, yet it was left to Newton to discover the reason why the apple falls to the earth; to Franklin to discover the identity of lightning and electricity; to Cavendish to discover the composition of the air we breathe; and to philosophers of our own day to discover the laws in virtue of which we see and hear. Laplace's great work of Celestial Mechanics was the product of the same period that witnessed the birth of a new science having for its object to determine the composition of the globe on which we live and move, and from which we derive our daily bread. It is thus as we approach nearer to man, his uses and purposes, we find the greatest retardation of that positive knowledge so early attained in reference to the method to be pursued in the effort for

its attainment. The study of the history of science leads inevitably to an agreement with Buffon in the opinion that "however great may be our interest in knowing ourselves," we probably "understand better all that is not ourselves"—and with Rousseau in the belief that "much philosophy is required for observing the facts that are very near to us."

Passing from the more abstract and general laws governing the movements of distant bodies toward those determining the composition of the matter by which we are surrounded, we find new laws, but all in harmony with those first obtained. Chemistry, following physics which deals with masses, deals with the elements of which they are composed, giving us atoms as obedient to the laws of gravitation as are the earth, the satellites of Jupiter, and Jupiter himself. "The distinction between physics and chemistry," says M. Comte, "is much less easy to establish than between chemistry and astronomy, and," as he continues, "it is one more difficult to pronounce upon from day to day as new discoveries bring to light closer relations between them."* That such is the case will readily be seen by the reader who reflects how much of the present great development of physical knowledge has been due to the labors of Cavendish, Priestley, Black, Davy, Lavoisier, Fourcroy, Gay-Lussac and other eminent chemists.

On another occasion M. Comte thus shows the intimate relation between physics on one side of chemistry, and physiology on the other:

"By the important series of electro-chemical phenomena chemistry becomes, as it were, a prolongation of physics; and at its other extremity, it lays the foundation of physiology by its research into organic combinations. These relations are so real that it has sometimes happened that chemists, untrained in the philosophy of science, have been uncertain whether a particular subject lay within their department, or ought to be referred either to physics or to physiology."†

As yet, he is of opinion that "the direct dependence of chemistry on astronomy" is very slight, but

* *Positive Philosophy*, Martineau's Translation, vol. i. p. 216.

† Ibid., vol. i. p. 298.

"When the time shall come for the development of concrete chemistry, that is, the methodical application of chemical knowledge to the natural history of the globe, astronomical considerations will no doubt enter in where now there seems no point of contact between the two sciences. Geology, immature as it is, hints to us such a future necessity, some vague instinct of which was probably in the minds of philosophers in the theological age, when they were fancifully and yet obstinately bent on uniting astrology and alchemy. It is, in fact, impossible to conceive of the great intestinal operations of the globe as radically independent of its planetary conditions."*

Passing thus from the masses of physics through the atoms into which they are resolved by chemistry, we next find those atoms arranging themselves in organized and living forms, and constituting the still more special subjects of vegetable, animal and human physiology, whose connection with chemistry is thus described:

"Physiology depends upon chemistry both as a point of departure and as a principal means of investigation. If we separate the phenomena of life, properly so called, from those of animality, it is clear that the first, in the double intestinal movements which characterizes them, are essentially chemical. The processes which result from organization have peculiar characteristics; but apart from such modifications, they are necessarily subjected to the general laws of chemical effects. Even in studying living bodies under a simply statical point of view, chemistry is of indispensable use in enabling us to distinguish with precision the different anatomical elements of any organism."†

Again, in treating of biology, he says:

"It is to chemistry that biology is by its nature most directly and completely subordinated. In analyzing the phenomena of life, we saw that the fundamental acts which, by their perpetuity, characterize that state, consist of a series of compositions and decompositions; and they are therefore of a chemical nature. Though in the most imperfect organisms, vital reactions are widely separated from common chemical effects, it is not the less true that

**Positive Philosophy*, Martineau's Translation, vol. i. p. 299.

†Ibid., vol. i. p. 300.

all the functions of the proper organic life are necessarily controlled by those fundamental laws of composition and decomposition which constitute the subject of chemical science. * * * Chemistry must clearly furnish the starting-point of every rational theory of nutrition, secretion, and, in short, all the functions of the vegetative life considered separately; each of which is controlled by the influence of chemical laws, except for the special modifications belonging to organic conditions."*

It is not, however, with chemistry alone that physiology is connected. Remote from astronomy as that department of knowledge appears to be, the relation between them "is more important," says M. Comte, "than is usually supposed. I mean," continues he, "Something more than the impossibility of understanding the theory of weight, and its effects upon the organism, apart from the consideration of general gravitation. I mean, besides, and more specially, that it is impossible to form a scientific conception of the conditions of vital existence without taking into the account the aggregate astronomical elements that characterize the planet which is the home of that vital existence. * * * *

"It may at first appear anomalous, and a breach of the encyclopedical arrangement of the sciences, that astronomy and biology should be thus immediately and eminently connected, while two other sciences lie between. But indispensable as are physics and chemistry, astronomy and biology are by their nature the two principal branches of natural philosophy. They, the complements of each other, include in their rational harmony the general system of our fundamental conceptions. The solar system and Man are the extreme terms within which our ideas will forever be included. The system first, and then Man, according to the positive course of our speculative reason: and the reverse in the active process: the laws of the system determining those of Man, and remaining unaffected by them. Between these two poles of natural philosophy the laws of physics interpose, as a kind of complement of the astronomical laws; and again, those of chemistry, as an immediate preliminary of the biological. Such being the rational and indissoluble constitution of these sciences, it becomes apparent why I insisted on the sub-

* *Positive Philosophy*, Martineau's Translation, vol. i. p. 379.

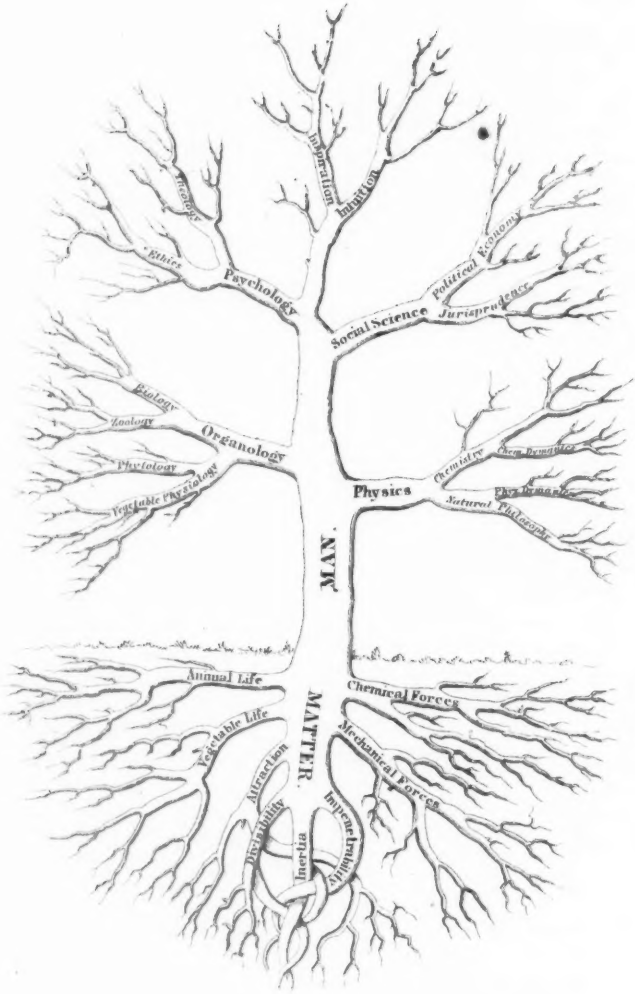
ordination of the study of Man to that of the system, as the primary philosophical characteristic of positive biology."

Passing now toward the more concrete and special department of knowledge treating of the relation of man with his fellow-man, and with the earth from which he derives his means of support, we find chemistry laying the foundation for it when "abolishing the idea of destruction and creation,"* and thus establishing the facts that the consumption of food is but a necessary step toward its reproduction; that in all the processes of agriculture man is but making a machine which supports him while engaged in making it; that the more time and mind he devotes to the development of the powers of the earth, the greater must be his power of consumption; and, that the more rapidly the consumption of food follows its production the more prompt will be the reproduction of the elements required for new supplies thereof. These views of the effect of the principle thus established had not occurred to M. Comte, but he shows clearly the direct connection of chemical and social science when telling his readers that

"Before anything was known of gaseous materials and products, many striking appearances must inevitably have inspired the idea of the real annihilation or production of matter in the general system of nature. These ideas could not yield to the true conception of decomposition and composition till we had decomposed air and water, and then analyzed vegetable and animal substances, and then finished with the analysis of alkalies and earths, thus exhibiting the fundamental principle of the indefinite perpetuity of matter. In vital phenomena, the chemical examination of not only the substances of living bodies, but their functions—imperfect as it yet is—must cast a strong light upon the economy of vital nature by showing that no organic matter radically heterogeneous to inorganic matter can exist, and that vital transformations are subject like all others to the universal laws of chemical phenomena."

The exhibit thus made by M. Comte of the close relation of the various departments of science has been not only confirmed but extended at every stage of progress since he wrote. In his recent address, delivered before the British Association, its President, Sir William Thomson, told its members, that "the earn-

**Positive Philosophy*, Martineau's Translation, p. 305.


Imperation
Intuition
Theology
Ethics
Psychology
Social Science
Political Economy
Jurisprudence
Biology
Zoology
Organology
Phytology
Vegetable Physiology
Physics
Chemistry
Chem. Dynamics
Natural Philosophy
MAN.
Animal Life
Vegetable Life
MATTER.
Chemical Forces
Mechanical Forces
Attraction
Divisibility
Inertia
Impenetrability

est naturalists of the present day," not appalled by difficulties, were "struggling boldly and laboriously to pass out of the mere natural history stage of their study, and bring zoölogy within the range of natural philosophy." The course of things is thus upward and onward, chemistry aiding in the development of physics, the researches of physiologists meanwhile making new demands upon, and thereby promoting the growth of, chemical science. Each helps and is helped by the other.

The root, the stem, the branches, the leaves and the blossoms of the tree are obedient to the same system of laws. Colored water applied to the root changes the color of the blossom, and stoppage of nourishment to the root destroys the tree. It is still but a single tree, and so is it with the tree of science, whose root is found in physics, its stem branching into those divisions which are based upon observation and experiment, leaving us to find the leaves, the blossoms and the fruit in the less demonstrable departments of knowledge.

That this is true as regards the more abstract and general portion of science, to which reference has here been made, can scarcely now be doubted. Wherefore, then, should we doubt that it would be found equally so in relation to those more concrete and special which treat of man in his relation with the material world—of man in his relations with his fellow-man—of man as a being capable of acquiring power over the various natural forces provided for his use, and responsible to his fellow-men and to his Creator for the proper use of the faculties with which he has been so wonderfully endowed? if the root, the stem and the branches obey the same laws, should we not find the blossoms and the fruit of the tree of science equally obedient to them, and will not the diagram opposite represent with considerable accuracy the relation of the various departments of knowledge and—having always regard to the fact that each has aided, as it has been aided by each and every other—the order of their march toward becoming perfect and exact science?

§ 3. "The distributions and partitions of knowledge," says Lord Bacon in his *Novum Organum*, "are not like several lines that meet in one angle, and *touch but in a point;* but are like branches of a tree that meet in a stem, which hath a dimension and quantity of entireness and continuance before it comes to discontinu-

ance and break itself into arms and boughs; therefore," as he continues, "it is good before we enter into the former distribution, to create and constitute one universal science by the name of Philosophia Prima, or Summary Philosophy, as the main or common way, before we come where the ways part and divide themselves."

Concerned as he was with the order and division of the sciences, and pledged as he was in the introduction to his work to furnish it, he failed to do so, "the first part of the Introduction which comprehends the division of the sciences" being, says his editor, "wanting." A study, so far as the idea of the text appears to require elucidation, rather than an attempt to supply the deficiency, is submitted in its stead.

The several *branches* of natural science are commonly spoken of, but the figure has a larger parallelism with the subject—a tree having not only branches but also roots. These latter are properly underground branches, constituting the structural support, and furnishing the vital subsistance of the tree, which grows from its roots and with them. Its stem, branches, flowers and fruits, being converted aliment supplied by and through the roots, the allusions of the figure are in good keeping with the natural history of the subject intended to be illustrated.

The central or taproot, as the reader sees, represents matter, with its essential properties of inertia, impenetrability, divisibility and attraction. The lateral ones stand on one side for mechanical and chemical forces, and on the other, for vegetable and animal ones—and from these substantive roots of being rises the stem—man, so composed as to his natural constitution. The soul, being the occult life of the structure, is incapable of representation, though manifested by its proper evidence in the flowers and fruits, the emotions and thoughts of his faculties.

We have now the stem—the man—"having dimension and quantity of entireness and continuance before it came to discontinue and break itself," branching off into his diverse activities. These branches are in functions, ramifying into all their specific differences of application. The first branch on the material side is Physics, as represented in the diagram. Its ramifications are into natural philosophy and chemistry—masses and atoms—and

the shoots from these are mechanics and chemical dynamics—the one being the action of masses, and the other that of atoms.

The main branch on the vital side of the tree, rising a little above physics, must necessarily be organology, branching first into the science of vegetable beings, phytology, then sending off the shoot, vegetable physiology; and second, into that of animal beings, zoölogy, leading to biology, or the science of life.

Following the stem in the natural order of rank and successive development, it is seen next giving off sciology, which divides itself into jurisprudence and political economy, while on the corresponding side of the main branch, psychology ramifies itself into ethics and theology—the tree finally topping out with intuition as the material branch and inspiration as the vital one. These highest and last-named are rightly the source of the other science or sciences to which Bacon alludes as standing above metaphysics, when he says that, "as for the vertical point, the summary law of nature, we know not whether man's inquiry can attain unto it"—that is, so as to order and methodize its teachings.

In this scheme of the sciences of things there is no place for either logic or mathematics, the respective regulative sciences of mind and matter. Neither of these belongs to natural history, being both alike mere instruments to be used in the study of nature.

Historically, the top branches of the tree of knowledge, as of all other trees, are first produced, and the branches next below are soon put forth, but mature later, the instincts of religion and reason appearing in their vigor in the childhood of the race. Social science necessarily, and metaphysics spontaneously, extend themselves as early as societies take form and speculation is awakened—bringing quickly forth the flowers and fruits of music, poetry, the fine arts, logic, mathematics and those generalities of speculative truth which are the products of imagination and reflection.* The correspondence between the figure chosen and the facts to be illustrated would seem to be complete.

*Xenophon urged upon his Athenian countrymen that in default of the domestic market for food that would have resulted from proper development of the mineral treasures with which their soil abounded, agriculture had become impossible; many having been forced to abandon it, becoming usurers of brokers. See *Journal des Economistes*, Sept, 1871, p. 365. This is probably the earliest exhibit on record of the dependence of agriculture on the mining and manufacturing industries.

In time, the branches nearer to the earth, more material in their substance and more dependent upon observation, obtain development in their larger diversity of use. The sciences of substance, of natural objects, grow and ramify themselves almost indefinitely —physical philosophy and organology, in their dependencies, shooting out in every direction of observation and experiment, at first overshadowed by the speculative branches above them, but always vivified by them; while in their turn repaying this service by affording substantive strength and corrective modification as they grow into maturity.

Such is the history of science, and such the illustration of its orderly divisions, succession, and co-ordination; it represents the compound nature of man, the sources of his powers, and the order of their development.

§ 4. Seeking to obtain power over matter, man desires to obtain a knowledge of the laws instituted for its government. To become the subject of law it is required that there be a regular and uniform succession of causes and effects, the nature of which may be expressed in distinct propositions—so that when we observe the former we may be enabled to predict the latter; or when the latter are observed we may safely assume the former to have preëxisted.

In the early ages of society theories abound, and for the reason that, in default of knowledge, almost every occurrence is regarded as accidental, or is attributed to the direct interposition of mythological powers, whose qualities are so vaguely conceived as to make the idea of the events depending upon their action scarcely one remove from that of its being absolutely fortuitous and irreducible to order and rule. The Greeks of the days of Homer solicited the aid of imaginary deities, themselves moved to action by the same feelings and passions that influenced their worshipers; precisely as does now the poor African who makes his oblations of corn or oil, palm-wine or rum, to the stock or stone, the alligator, or the bundle of rags, he has chosen for his idol. With time, however, the regular succession of effects and causes comes to be understood, and at every stage of progress theory tends to pass sway, yielding place to knowledge; this latter bringing with it power to direct the forces of nature to main service. At each such stage he obtains new evidence of the uni-

versality of natural laws—new proof that where exceptions appear to exist they are but appearances and will, when carefully analyzed and fully understood, but prove the rule; as does the smoke when rising in apparent opposition to the great law in virtue of which all the matter of which the earth is composed tends toward its center.*

To prove the universality of law, thereby establishing the unity of science, seemed at first to be the intention of M. Comte, from whose work preliminary to, and intended as the basis of, the one that was to be specially devoted to social science, the preceding extracts have been made. The promised work subsequently appeared, but in it, as before when treating of man and his operations, he intentionally ignored that mathematical method to which the earlier and more developed departments of science had so largely been indebted. That he should so have done would seem to have been a consequence of regarding mathematics as a science, and not as a mere instrument for the acquisition of scientific knowledge. Thus, in treating of chemistry, he tells us that "every attempt to refer chemical questions to mathematical doctrines must be considered, now and always, profoundly irrational, as being contrary to the nature of the phenomena."† What, however, are these doctrines? Are they anything beyond simple formulæ adapted to the peculiar circumstances of the case under consideration? Certainly not. The geometer tells us that every whole is equal to all its parts, and that things which are halves of the same thing are equal, axioms of universal application, and equally true in relation to all bodies, whether those treated by the chemist, the sociologist or the measurer of land, but involving no question of doctrine whatsoever.

Occasionally M. Comte speaks of mathematics as what it clearly is, an "instrument of admirable efficacy," but being an instrument it can no more be a science than can a key become a lock.

* "We ought to conceive the study of nature as destined to furnish the true rational basis of the action of man upon nature; because the knowledge of the laws of phenomena, of which the invariable result is foresight, and that alone, can conduct us in active life to modify the one by the other to our advantage. In short, SCIENCE WHENCE FORESIGHT, FORESIGHT WHENCE ACTION, such is the simple formula which expresses the general relation of Science and Art."—*Comte.*

† Ibid., vol. i. p. 299.

That instrument, the mathematical method, is always applicable, whatever may be the subject of investigation. That method is analysis—the study of each separate cause tending to produce a given effect. To it we owe all the discoveries of Copernicus, Kepler, Newton and their successors; such too being the method of the chemist, who commences by ascertaining the separate force of each of his various ingredients, and ends by deducing the law of the effect. When engaged in the study of the skeleton the physiologist uses the formulæ of the physicist; but when studying the composition of the blood he resorts necessarily to those of the chemist, in which is embodied all the knowledge derived from the observation of the philosophers by whom he had been preceded. This method, however, is discarded by M. Comte in treating of social science, as will be seen by the following passage:

"There can be no scientific study of society, either in its conditions or its movements, if it is separated into portions, and its divisions are studied apart. I have already remarked upon this in regard to what is called political economy. Materials may be furnished by the observation of different departments; and such observation may be necessary for that object; but it cannot be called science. The methodical division of studies which takes place in the simple inorganic sciences is thoroughly irrational in the recent and complex science of society, and can produce no results. The day may come when some sort of subdivision may be practicable and desirable; but it is impossible for us now to anticipate what the principle of distribution may be; for the principle itself must arise from the development of the science; and that development can take place no otherwise than by our formation of the science as a whole."

"In the organic sciences the elements are much better known to us than the whole which they constitute; so that in that case we must proceed from the simple to the compound. But the reverse method is necessary in the study of man and of society; man and society as a whole being better known to us, and more accessible subjects of study than the parts which constitute them."*

To pursue the course thus indicated would be to go back to what M. Comte was accustomed to denominate the metaphysical stage of science. The philosopher of old would, in like manner, have said: "These masses of granite are better known to us than the parts of which they are composed, and therefore we will limit our inquiries to the questions as to how they came to have their

* *Positive Philosophy*, Martineau's Translation, vol. ii. p. 81.

existing form and occupy their present position." Without the analysis of the chemist it would have been as impossible that we should be enabled to "penetrate into the details" of the piece of stone, and thus to acquire a knowledge of the composition of the distant mountain from which it has been taken, as it would now be for us to penetrate into those of the communities that have passed away, were we not in the midst of living ones, composed of men endowed with the same gifts and animated by the same feelings and passions observed to have existed among those of ancient times; and were we not, too, possessors of the numerous facts accumulated during the many centuries that since have intervened. It is the details of life around us that we need to study, commencing by analysis and proceeding to synthesis, as does the chemist when he resolves the piece of granite into atoms, and thus acquires the secret of the composition of the mass. Having ascertained that it is composed of quartz, feldspar and mica, and having fully satisfied himself of the circumstances under which it appears in the country near to him, he feels entire confidence that wherever else it may be found, its composition and its position in the order of formation will be the same. He is constantly going from the near and the known which he can analyze and examine, to the distant and the unknown which he cannot; studying the latter by means of formulæ obtained by analysis of the former. Thus it was that by the study of the deposits of Siberia and California, the geologist was enabled to predict that gold would be found among the mountains of Australia.

(TO BE CONTINUED.)

THE PHILOSOPHY OF THE FRENCH REVOLUTION.

BY PAUL JANET.

Translated from Revue des deux Mondes, by O. H. K.

THE THEORISTS OF THE REVOLUTIONARY IDEA.

I.

THE course of the French Revolution is a continuous series of new departures. At each new phase of its history, new points of view are occupied, new theories arise, and as often as the philosophy changed, so often did a victorious course of reasons

show, as necessarily following, the most opposite consequences. Such a diversity of opinions is not at all unnatural; it is the regular result of the complication of things. Boundless sources, immensely varying fortunes, a concatenation of events which no one could have foreseen and which none could have controlled; such are the elements which this tragic and always new drama offers for the meditation of the thinker. We should not wonder at all that each one looks at this history from the point of view of his own opinions and affections, and that, refracted from so many prisms, it should appear under the most different forms. Complicated both in itself and in its history, the Revolution still remains *the* event in European history.

Our continental situation has not permitted the nation to develop so freely as America or England have; it is easily mixed up with the interests of other nations; whence springs still another source of complication. And, finally, the progress of science and of historical criticism, by their more exact and profound comparisons of our history with that of other nations, naturally correct more than one prejudice, while, perhaps, they introduce new ones.

We are not so presumptuous as to add a new opinion, or a new theory, to all that has been written, thought and professed by so many illustrious writers; we think that instead of extending the field of contention it will be better to bring it within reasonable bounds. It seems to us that, in order to judge correctly of so great a subject, it will be best to collect all the opinions expressed by competent judges; all those, at least, whether good or bad, which have weight. Perhaps these judgments, collected with sincerity, summarized with precision and criticised with justice, may serve to limit each other, and the truth, which is the mean between the two, may come out of the conflict of these contradictory statements. It is with this view that we have made this sort of historical sketch of the philosophy of the French Revolution. It can, without violence, be divided into two distinct periods: the period of contest, when we see on either side the "pro" and the "con.," the "yes" and the "no," with all the excess of passion and partisanship, and the period of criticism, of reflection, examination and doubt. Between the fanaticism of

the first period and the skepticism of the second it remains for reason to show us the right way.

Of all the countries of Europe, the one in which the principles of the French Revolution first attracted attention and provoked examination, was England, caused both by the free discussion of politics, to which she was accustomed, and by her having given us the example of a revolution like our own. In the front rank of those who from the first took our part, and never abandoned our cause, we must place the great orator of the Whig party, the celebrated adversary of Pitt, and one of his successors in the ministry—Fox, whose name should never be forgotten by the French people, so rare among our neighbors are statesmen who have loved France. Among the adversaries of the Revolution who, with an equal strength of conviction, an equal love for their country, and also, as they believed, for liberty and humanity, have, in their speeches as well as by their writings, combated and solemnly reproved this new revolution, so different, in their eyes, from their own, we must place Burke, likewise one of the leaders of the Whig party, bound to Fox, up to that time, by the ties of closest friendship, but who broke with him in a memorable session of Parliament for no other reason than the difference of opinion caused by the events in France.

Fox wrote nothing on the French Revolution; he only developed his opinions in his speeches. But Burke was not content to hurl at it, in speaking, the most exagerated and provoking accusations, but published a very bitter and diffuse pamphlet, which was, however, full of sharp and prophetic views, under the title: *Reflections on the Revolution in France*, in the form of a letter to a friend.* In this work we see Edmund Burke in the excess of fear lest the new principles might result in England, in a natural confusion of the revolutions which have taken place in the two countries. There were not then wanting, even in England, bold spirits who declared that the English Constitution rested, or seemed to rest, on the principle that men were trying to introduce into France, *i. e.*, the sovereignty of the people, which

*This work produced a great effect in Europe. The American, Tom Paine, refuted it in his book on *The Rights of Men*. Priestly combated it as well in his *Reflections on the Revolution*. See in reference to Burke the remarkable study in the *Revue* of the 1st of Jan. and 1st of Feb., 1853.

might open the way to wonder why they did not draw the same consequences from them.

To this philosophical and radical procedure, which characterized the French Revolution, Burke opposes the historic procedure which characterized the English Revolution. He is far from upholding, as the Jacobins did, the divine right of kings; but he argues that the change of dynasty which took place in the 17th century was only an exceptional lapse from the law of hereditary succession, a lapse which they have tried to make as small as possible. It is easy, as he says, to conciliate the sacred principle of the hereditary nature of the crown with the right to change its application, which should not be done except at the wish of the party at fault, as it was not right to decompose the political body altogether, under the pretext of creating an absolutely new rank. With the common sense which in politics characterizes the English mind, Burke advanced the idea that coördinate with the principles of "conservatism" should be that of "reform," as otherwise a society whose chief is mad or criminal would of necessity perish; but this reform should be limited to what was strictly necessary, and should depart as little as possible from the regular and traditional order. Thus, during the Revolution of 1688, James II. was declared to have abdicated, and in consequence the throne was vacant, which permitted the accession of the next heir, although no one could infer from this particular case an absolute right to "dethrone kings and set them up." By virtue of these principles, Burke denied that the people had a right to change the form of government when they pleased. The mere idea of "a new government" sufficed, in his eyes, to inspire "disgust and horror." English liberty is not an *a priori* right, it is an "inheritance." It has "its armories, its picture galleries, its inscriptions, its archives, its proofs and its titles." In one word, says Burke eloquently, "Our liberty is *nobility*."

It was this traditional and historic liberty, founded on monuments, and not on abstractions, that Burke would have liked to have seen established in France. He conceded that the old French Constitution had been much damaged, but portions of the walls still remained, and the foundations still stood. He tried then to show how the rights of the nobility, the organization of clergy, the assemblies, the provincial privileges, how all these in-

stitutions, more or less altered for the worse by time, could, with some improvements, serve to build up the new edifice. It will always be, without doubt, a cause for regret that the French Revolution did not terminate, as Burke desired, in a lasting compromise between the past and the future, aristocracy and democracy, the king and the people, between traditions and progress, between right and privilege. No doubt a continuous and regular advance in reform is a thousand times better than these rough outbursts which overthrow everything, and have, besides, the misfortune to be followed by contests which sap the vitality of the nation. Happy the nation whose conservatism is reforming and whose reform is conservative.

Burke and his modern disciples continually hold up to France the example of England—they talk of nothing but 1688, and seem to forget entirely that there was a year 1641, in which the English were far from showing the same spirit of wise reform without violence, which they exhibited fifty years later. Yes; undoubtedly, in 1688 the English made a prudent reform, but it was forty-eight years after the first. Does it not seem to have been a sufficiently radical revolution which decapitated Charles I., established the republic* in England and made Cromwell protector? Supposing that France, as Burke wished, ought to have imitated England, she should have fifty years in which to do it.

* M. Janet very gravely misapprehends the tendencies and the significance of the revolution of 1641. The real representatives at that time of those Jacobins, who gave character to the French Revolution, were the Levellers, whom Cromwell kept down with a strong hand. Carlyle (who has studied both revolutions) describes their secret conspiracy in the army as "a whole submarine world of Calvinistic sansculottism, Five Point Charter and the Rights of Man threatening to emerge two centuries before its time." Their Rousseau, Captain Everard, declared their "intent to restore creation to its former condition," and prophesied "that the time will suddenly be when all men shall willingly come in and give up their lands and estates and submit to community of good." To this end they wished to burn up the records in the Tower, abolish all existing offices and start afresh under a Democratic Republic of Saints. Cromwell's speeches place him on the same ground with Burke; he wished the future of the nation to be in historical continuity with its past; he was no republican, and the Commonwealth under him was no republic; he wished for a hereditary monarchy, but without the name of "kingship," which had become offensive to many who were as little bent on material innovation as himself. The execution of Charles I. could only be regarded as a Jacobinish break with the past by those who regarded the succession of a single house as essential to the historical continuity of the nation, and in that respect 1688 was as bad as 1640. There were even precedents for both in the earlier history of the nation.—Ed. *P. M.*

Up to 1830 England had nothing to reproach us with, for we had done only what she herself did. She gave us the example of the regicide, that of the republic, that of the military government, that of a counter-revolution, and finally that of a new revolution in favor of a younger branch of the royal family. One can understand that France should be reproached to-day for not having yet known how to stop her course with a reasonable variety, but running continually into some new and unknown form; but Burke had not the right; he was in too much of a hurry in asking of France that she should stop short, at first, at that point which it took England fifty years to reach. Besides, did not Burke, preoccupied by the model which he had before his eyes, believe too easily in the possibility of France imitating that example? Montesquieu seems to have seen better when he said: "Abolish in a monarchy the prerogatives of the aristocracy, of the clergy and of the cities, and you will soon have a republic, or, more probably, a despotism." What then did the ancient monarchy do two or three centuries ago? She destroyed all the hereditary liberties, communes, assemblies, aristocracy, states-general, clergy; all had been effaced, destroyed, leveled for the profit of the Prince. How can the ancient edifice of the French Constitution be rebuilt? Where can we find again those old charters and title papers of that traditional liberty which should be our heritage? Burke is right in saying "that no power, no institution could render them different from that which God, nature and their education and habits made them." Now, in France, just as tradition was a leveler, so royalty had begun the leveling process; democracy was in France just as natural a consequence as aristocracy in England.

It is impossible to misconceive the danger of a revolution which arises from sources too general and too abstract, for, these sources not being precisely defined, each one bounds them according to his own views, and as soon as he believes them to be violated, appeals to the right of force. So it may be right to say with Burke that the French Revolution prepared "a mine," whose explosion would overthrow all governments. This mine "is the rights of man," and he correctly remarks that all these rights are absolute and extreme in theory, whereas in practice they can never be anything "but a mean, a compromise between a good and an

evil, frequently, indeed, between two evils." The theoretic justice of these assertions cannot fail to be recognized. But while we regret that the Revolution was introduced by a metaphysical preface, it would be useless and, perhaps, dangerous to formulate these rights under an absolute rule. After all, it is probably nothing more than a question of rule and conduct, and, perhaps, in examining closely this celebrated decalogue of the rights of the man and the citizen, we would find that these rights were precisely that mean of legitimate and necessary wants to which the manners, civilization and growing interests of men have gradually led their minds, and that if there has been a sudden and frightful explosion it is because these wants have not been satisfied in time.

Further, it is necessary in this celebrated declaration to distinguish the principles of political rule from those of civil order. And to the same extent as the first have been powerless, up to this time, to give us a durable order, just so far have the second been lively and energetic, notwithstanding partial and transient mutilations. In fact, the principles of the "*Declaration of Rights*" are exactly those which have been most firm and persistent in our own revolutions. All the political institutions which have tried to establish themselves have perished, one after another, and it is still an unsolved problem whether a revolution so radical in its nature can originate and support a government; but, while the constitutions fall, the social foundations, laid by the "*Declaration of Rights*," remain as firm as ever. The charter of 1814 and the constitution of 1852 recognize explicitly the same fundamental principles. Furthermore, these principles are tending toward becoming the rules of all civilized society, and aristocratic England herself bends toward them, little by little, as well as feudal Germany.

While Burke places himself, in his criticism, at the exclusive point of view of history and tradition, the German philosopher, Fichte, then in his youth, and full of that ideologic and speculative frenzy of which the Germans have been so well cured since, sustains the philosophic view with the most fearless freshness, and with an exuberance of abstract phraseology which, at least, was not, in the eighteenth century, the fault of our philosophers. Fichte teaches us that "to judge of the lawfulness of a revolution" we must "arise to the original form of our spirit;"

that "it is from our I, not as it is moulded by experience, but from the I pure outside of all experience," that we must draw this judgment. We can thus see to what a height of abstraction it is necessary, according to the German philosopher, to raise ourselves before being fit to speak concerning the French Revolution.

In fact, Fichte makes an important distinction; there are, according to him, two things to consider in a revolution—its lawfulness and its wisdom. Its lawfulness can be judged of only by the *a priori* principles planted "in the escence of the I;" as to its wisdom, the criterion is derived from experience. You may perhaps think that the author makes here some concession to the historical school. By no means. Experience, to him, is not that of history; "what good does it do us to know how many grand monarchies there have been, or what was the date of the battle of Philippi? No! true experience is that of psychology; it is the experimental cognizances of the human soul." That is the manner, according to him, of judgment most solid and the least subject to error. "Common history has nothing to do with it."

So history, which is all in all in Burke's view, is nothing at all in that of Fichte; the one sees nothing but heritages and historic traditions; the other rejects with scorn all political and social facts. He shuts himself up in his pure ego; and when he condescends to come down to experience, it is to the abstract experience of man in general, rather than to the living and concrete experience of the historian, that he has recourse. Besides, of the two questions propounded by him, as to its lawfulness and its expediency, Fichte discussed the first only, and that in most general terms. For him, the question whether a revolution is lawful or not, is entirely dependent upon the question whether a nation has a right to change its political form. In order to prove this aright, Fichte founds his argument upon the principle of Rousseau, *i. e.*, the idea of the "social contract," and if it should be asked: Who has seen such a contract? where are the papers? at what time and place was it entered into? Fichte answers that the "social contract" must not be understood in a historical sense, that Rousseau himself never regarded it in that light; that this contract is only an "idea," and that it is after this idea, considered as type and rule, that societies of men should act. It is, then, not in fact but in right that civil societies rest

upon a contract; and it follows manifestly from these premises that nations have the right to change this form of government, since the contracting parties can always modify the terms of the contract. Might it not happen, however, that the essential part of the contract should be of such a nature as to be eternal and irrevocable? No, for such a want of change is contrary to the destiny of humanity, and this destiny, according to Fichte, is "culture," *i. e.*, the exercise of all our faculties, in view of the principle of absolute liberty, of absolute indifference to everything which is not ourselves, of everything which is not our pure and absolute *ego;* in simpler terms, man is here to develop himself, and to subject the objects of civilization to his moral faculties. Man has, then, the right to remove one by one the obstacles which are in the way of his internal development. He has the right to modify all the political institutions, which have not for their object the advancement of his liberty; but as there is no institution which is not, more or less, an obstacle, there is none which is irresistible. Those which are bad, and go contrary to all political order, should be changed; the good, on the contrary, will change themselves. "The first are a fire of rotten straw, which should be put out; the second, a lamp which consumes itself in proportion to its light."

Fichte carries the principle of the social contract so far as to admit that every man has the right to withdraw from the nation to which he belongs; he recognizes it as one of the rights of any body of men; in one word, he acknowledges the right of secession in its extreme sense. If this right belongs to the smallest number, with still greater reason does it to a larger number, and still more to the whole nation: thus from the right of secession comes the right of revolution.

It may be believed that, by taking a point of view so rigorously abstract, all difficulties will be removed; but you do not get rid of any. No doubt a nation has always the right to make what institutions it pleases, but, in fact, a nation is never in that state of ideal nature, in which he places himself; it is always in a determinate civil and political condition; it obeys the lawful powers, and beyond these legal powers nothing is done rightfully. The question then is reduced to this: Are there any cases, and what are they, in which the people, called together by an

authority, lawful or not, and again become sovereign, have the right to tear down the old walls, and build anew the political edifice? This is the very problem raised by the French revolution. But howsoever much you believe in the dogma of popular sovereignty, it is very difficult to admit that the very day the states-general met the king had ceased to be king, the nobility to be nobility, the parliaments parliament, that all the institutions had been suspended, and that the people had re-entered the state of nature. No human society can exist without a form of law, written or unwritten, and without some civil and political order; it is subject to that order until it has replaced it, and it can not alter it without submitting to it. In pure and abstract right, the people, in their lawful assemblies, is the only sovereign; in historic and positive right, the collection of established institutions was the sole representative of law, and nothing about it could be changed without the concurrence of the lawful powers. Such is the problem, the entire difficulty of which Fichte does not seem to have realized.

In our opinion, there is no absolute and *a priori* criterion with reference to the lawfulness of a revolution. It is a question of estimation, and the judgment should be, if I may so express myself, composed of the historic and of the philosophic rights of legality as well as justice. Let us apply this principle to the French Revolution. Without asking whether the people have the right to change the form of government, we will say that a nation should not be destroyed by the very institutions which are charged with its preservation. Now in 1789 the French kingdom had not only become powerless, but had declared itself so by the convocation of the states-general. After having tried all measures, and seeing that it was absolutely impossible to govern any longer, the government called the nation together and thus gave up its absolute power; in calling upon the nation to share its responsibility, it called upon it to share the powers, for if there is no power without responsibility, as true is it that there is no responsibility without power. The nation, in its turn, or at least the most numerous portion of the people, the productive and laboring class, when called upon to save the finances of the State, has the right to take securities for the future, and by this means deliver themselves from the obstacles which weigh them down.

Consequently the abolition of the feudal system and the absolute monarchy were implicitly contained and accepted beforehand in the convocation of the states-general. These two points are the two essential matters in the French Revolution, which, thus, is in principle not only just, but lawful. Those who to-day defend the revolution are by no means compelled to accept all its phases and accidents. The essential part of the revolution was the abolition of the *ancien regime*, which abdicated of its own accord, by reason of want of power. The revolution then, was just in itself, however wrong and culpable it may have been in its developments.

History and philosophy, however, are not the only points whence to judge human events; higher than either is religion. So long as we are only considering the ordinary facts of the political life of nations, it is not only not usual, but injudicious, to bring God in too prominently; it seems like lowering Him to make Him play a *role* alongside of the little passions and common interests of mankind.* But when events assume vast proportions, when, by their unexpected greatness, they cause astonishment and awe, the thinker and the believer can hardly escape the temptation of seeing in these great crises the living presence and terrible hand of Providence. Bishop Salvianus tells us that at the time of the great invasions the astonished people asked with fright: "Why have the Romans, why have the Christians been overcome by the barbarians?" Joseph de Maistre likewise tells us that the vanquished in the revolution showed the same terror, and could not understand anything of what was going on before them. "*I do not understand at all*" is the common saying of the day, "How is it that the most wicked men in the world triumph over the world?" The invasion, like the revolution, were a divine

*An extremely French opinion; but those who have studied history in English or German schools will hardly accede to it. We cannot quite look on Isaiah as one who belittled God by mixing up his name with the petty politics of Judea and Israel. Goethe well says that the Bible was written to show us the greatness of little things. Lessing, in his *Education of the Race*, presents to us the course of history as a divine education of men. The same idea has been far more amply and ably presented in the writings of that greatest of living theologians, metaphysicians and political philosophers— Prof. F. D. Maurice, especially in his *Prophets and Kings of the Old Testament*. Mr. Mulford, who has studied Maurice in connection with many other thinkers, embodies the same view in his work—*The Nation*.—ED. *P. M.*

chastisement. "We are visited," said Salvianus, "by a judgment of God, and it is for our loss that this race has been sent against us, this race which marches from district to district, and from city to city, destroying and carrying off everything in its path; it is the hand of Providence which sent them to Spain, to chastise the Spaniards for their omissions, and into Africa to lay waste everything. They themselves avow that what they do is not their own work (*suum non esse quod facerint*), and that they were urged on by a divine decree." A similar sentiment of fear and severe mysticism must have affected men's spirits at the sight of the prodigious changes of the revolution, from that new invasion of barbarians, as Mad. de Staël calls it, an invasion as deadly and destructive as those that Salvianus saw.

This thought is developed by two very different thinkers, but bound together by some common traits, and who have given analogous theories of the French Revolution. Saint-Martin, the philosopher, the hardy and candid mystic, and Joseph de Maistre, the author of *The Pope*, the eloquent and intrepid believer in the intimate government of God; he first, somewhat heretical, but more preoccupied with heaven than earth; the second, more orthodox, but much more attentive to the affairs of earth than to those of heaven; the one rather a friend, the other a declared foe to the revolution. Both took the religious view of it; but the first believed that it was about to realize the mystic ideal which was in his mind, and that it would result in a new form of religion; the other thought, on the contrary, that it would terminate by a restoration of all which it had destroyed.

It is in a letter to a friend that Saint-Martin expressed his views on the Revolution and opened the way to M. de Maistre. Saint-Martin was one of the first to recognize the Revolution not only as a great event in the history of France, but in that of mankind. "It is," said he, "the Revolution of the human race." In it he saw "The footprint of Providence at every step." What, then, is the meaning of this providential event? It is a great expiation, "a miniature of the last judgment." It is a panorama which represents everything which, in that last crisis, will be realized instantaneously. France has been visited first, and most severely, because she was most wrong; "but the other nations in their turn will not be more spared than she." Thus we see that

the Revolution was for Saint-Martin, as well as for Joseph de Maistre, an expiation; but their thoughts are always different. For the first, this great expiation is much less a punishment for the impious philosophy of the 18th century* than for the Christian idolatry represented by the Catholic priesthood. He remarks that the priesthood suffered more from the Revolution than the nobility, which, though in his eyes "a monstrous excrescence," had not much to lose, having been abased long before by the king and his ministers. The priests on the contrary were still "in the enjoyment of their fictitious rights and temporal usurpations;" and must be regarded "as most wrong and as the sole authors of all the crimes committed by the other orders." "It is the clergy," Saint-Martin further says, which is "the indirect cause of the crimes of the kings," and which, while unceasingly speaking of God, have done everything to advance their own power. It has covered the earth with temples "whose principal idol it has been itself;" it has "turned prayer out of the way instead of giving it free course;" "it has transformed all the beneficient rights which it has received into a ruinous waste and a despotic rule over the consciences of men;" and made the sacred books "a list of exactions." In one word, Saint-Martin looked upon the priesthood as "the monopolists of the food of the soul." And, according to him, it was they that Providence had particularly in view in the course of the Revolution. Of what nature, then, for Saint-Martin, is the object of this great crisis? It is essentially religious. "Providence," says he, "is much more concerned with facts than with words. The wars of the 16th century, which are called religious, were political; whereas, the Revolution, which seemed only political, is at bottom a religious war; it was the crisis of the struggle between the expiring human powers and a new, natural and living power." It might be said of this spectacle, as Pharaoh's magicians did at the sight of Moses' wonders: "Here is the hand of God." The final aim of all these wonders is to conduct the nations to the height of the divine, spiritual and natural theocracy which should be their form of government. So this great crisis is only a sign of an ultimate restoration, and "a positive plan of renovation."

*He considers Jean Jacques Rousseau as "an apostle," as "a prophet."

Saint-Martin was not, after all, inimical to the revolution, although he placed the political and social aims which it pursued in a very inferior rank. He shared its passions against the *ancien regime*, against royalty, nobility and priesthood, and if he saw in it a punishment, it was a chastisement for the past. Joseph de Maistre, on the other hand, is the consistent irreconcilable adversary of the Revolution; in his sight, it is "radically" bad; it is "an event unique in history;" but why? because it is "satanic." But, bad as it was, and even because it was an absolute evil, we must guard ourselves from believing that it was only an accident from some superficial cause. It is "a great epoch," an event truly providential and "decreed," and a "miracle" in the true meaning of the word; its fatality is its most striking characteristic. It led men, more than they regulated it, as Salvianus says: *barbari compelluntur inviti.*

We see that de Maistre speaks of the revolution and its fatal nature exactly as the Jacobin fanatics did somewhat later; for him as for them, France was performing a mission in the world, and the Revolution formed part of this mission, only, according to the Jacobins, her mission was to establish the rules of reason and liberty; but in de Maistre's view it was that she should be the most Christian nation. Now France, having misconceived and given up its mission in the eighteenth century, having laid violent hands on the sacred tree, which it was charged to protect and tend, deserved to be punished in proportion to its offense; and as the crime was very great, the chastisement should be equally so. Why then should the innocent be punished along with the guilty? There were no innocent people; the entire nation was in fault for the great outrage which they committed, for the outrage against their sovereign, for the death of Louis XVI. "There have been nations condemned to be blotted out entirely." The French people seem to have understood it, so passively did each take his own punishment. "Never did sanguinary despot play with the lives of men with so much insolence, and never has a people gone so passively to the butcher's knife. Neither fire nor sword, neither cold nor hunger, nor sufferings of every kind, *nothing made them dissatisfied with their punishment.*"

Saint-Martin and de Maistre have shown penetration and sagacity in recognizing the French Revolution as an important

event in the history of the world. It was, without doubt, providential, and announced a new era in the world. If we consider, besides, the bloody fanaticism of the revolutionary spirit, we can say that it is also a satanic event. Satanic and providential; such is the double aspect presented by it. Further, it was an expiation—the expiation of two centuries of despotism and license. But if these two writers have well described it as to its past and present, they have both been wrong in prophesying the future. Perhaps, however, their prophesies may not be so far wrong after a time. Who knows whether the church, when the struggle now so fiercely raging shall have been ended or moderated, may not find in modern liberty a power such as she does not suspect, and which will restore to her an empire more solid than that which she lost? Who knows whether, outside of the church, all the confused and divergent elements of religious renovation, which, at least, are evidence of a real and deep-seated need, will not organize themselves around a common center, and the old Christian form, more or less transformed be the common focus. In criticising prophets, let us beware of prophesying in our turn; but we can say now that the European nations, if they do not wish to perish like the Roman empire, must find some religion to draw men's souls away from the two evils which divide them to-day: a criminal atheism and an effete theocracy.

But the theological idea, though predominant in the book of Joseph de Maistre, is not the only one. He, like Burke, maintains the principles of the historic school; like him, but with greater precision, he maintains that the institutions of a country are handed down, and not the artificial product of the human will, from which spring the frequently cited aphorisms: "No form of government is the result of deliberation; the rights of the people are not written; the more there is written, the weaker is the institution; no nation can give itself liberty if it has it not." For him the fundamental error of the French Revolution was, that it was *a priori*, metaphysical, resulting from vague definitions and abstract formulas, and that instead of seeking the rights of the French, and the form of government which was proper for them, it began by proclaiming the "rights of Man," as if there was any where a living being called Man; as he himself says: "There is no such thing as Man in the world. I have

seen Frenchmen, Italians, Russians, etc., but have never met Man in my life."

This injurious and plausible objection is one which has had the greatest success; it has frequently been, and still often is, brought forward. Is it not possible, however, that there may be in some part of the world a nation whose proper occupation is the transformation of social facts into general ideas; a nation, which prefers the abstract to the concrete, the universal to the particular, a nation which, endowed to the highest degree with the instinct of sociability, shall rather seek in men their points of resemblance than their points of difference; a nation more occupied with what ought to be than what has been; of their own will putting aside tradition and obeying ideal justice; a nation philosophical, not like the Germans, who limit philosophy to metaphysics, nor like the English, who see in it nothing but empiricism; but whose philosophy should be justice and equity? Now, if such a nation became enlightened; if abuses continued to increase at the same time that their reason was forming; if at any time there arose a conflict between the public mind and superannuated institutions, is it not true, that in claiming general and universal rights, in proclaiming "the rights of Man," such a nation would be exactly carrying out its own nature, its own traditions? Let us not be afraid, notwithstanding the criticisms of the patrician theocrat and his modern disciples, of applauding the Revolution, for having tried to establish the general rights of Man instead of historic privileges. Why should not man seek to approach from day to day nearer the essence of Man? This fine title Man has nothing whatever unworthy, and besides it has antiquity, both profane and sacred; *Homo res sacra homini*, says Seneca; *Faciamus hominem ad imaginem nostram*, says the Septuagist. Do you suppose that when God created the first man our theocrat would have said that God did not recognize Man, but only Englishmen, Frenchmen and Russians? Was, then, Adam French, or Russian, or what? Man and nothing more.

It is the bent of the Christian religion, as well as that of philosophy, to regard men by a common type. Thus the Revolution, then, was not wrong in proclaiming "the rights of Man;" but,

like the Catholicism of the Middle Ages, in enforcing them by fire and sword.

While the aristocratic and theocratic schools rejected and denounced the Revolution, the constitutional school, at the same time that it blamed its excesses, timidly took its part, and, soon after, the young liberal school of the restoration, more daring, took up its defense boldly. As early as 1792 Mounier, one of the first who despaired, and as early as the days of October, abandoned the constituent assembly, where, he believed, there was no more good to be done, in the very book in which he demanded a counter-revolution, made a most severe criticism of the *ancien regime*, and declared its reëstablishment impossible. He justified the first acts of the states-general, in which he participated, viz.: the abolishing of the higher ranks of society and the oath of the *Jeu de Paume*, and did not consider the Revolution illegitimate until it passed those points; an ordinary frame of mind in times of revolution, when each one takes his own opinion as the absolute criterion of right and wrong.

Of the same shade of opinion, but more openly and with a somewhat greater degree of boldness, is Mme. de Staël, whose fine book, *Considérations sur la Révolution Francaise*, is well known. Unfortunately for us, it consists more of memoirs of the revolutionists, and chiefly of M. Necker, than of theoretic and general discussion, and we find expressed correct and accurate views of particular events, rather than a judgment of the whole. It contains, nevertheless, two important subjects of thought. The first is frequently cited, "that in France liberty is ancient and despotism modern." The second is, that before 1789 France had no political constitution, and that it is the right of a nation to have a constitution.

By the first of these thoughts, Mme. de Staël armed herself for the defense of the Revolution against the objections directed against her. It has been one of the reproaches against the French Revolution that it endeavored to make an entirely new order of things by founding liberty in a land profoundly monarchical; and they repeat what de Maistre says, that no people can give themselves liberty, unless they had it before; but Mme. de Staël on this point agreeing with Burke (how frequently it happens that adversaries use the same train of thoughts), answers that, if France

had not liberty in 1789, she had it formerly; she showed, by reference to Retz, Fenelon and Montesquieu, that if there was any usurpation, it was on the side of the monarchy, which gradually made itself absolute, without having been so formerly; and thus the liberty claimed in 1789 was not only of natural but of historic right. Doubtless the aristocratic, as well as the liberal school, could use the same course of argument in reference to a quasi feudal restoration; but this restoration could not take place without a revolution.

Mme. de Staël found no greater difficulty in showing that France in 1789 had no constitution, if, indeed, she had ever had one; for, except the principle of an hereditary monarchy and the salic law, it would be difficult to find what are called the fundamental laws of the ancient monarchy. "However," said Mme. de Staël, "it is the right of a people to have a constitution," and this right was recognized even by the supporters of traditional monarchy.* The revolution, then, was legitimate, in principle at least. In fact, this pretended right of every nation to have a constitution may now appear somewhat abstract and utopian, for we have become as skeptical in that matter as they were confidant and candid in 1789; and it would be misunderstanding the question, and opposing one prejudice to another to bring up against Mme. de Staël our active skepticism in reference to those "paper rags" which are called written constitutions. It is very easily maintained, and is our opinion, that the best constitutions are those which are built up from day to day by custom, practice and experience, and not by abstract combinations; only, in order that this practical growth toward perfection should be possible, it is evidently necessary that there should be preëxistent institutions, which may be modified and may develope with the passage of time, for if there be none, how can they grow? Those who ridicule our ten or twelve constitutions are right, so far as the theories of each of them go; but they do not notice that from all those constitutions practice has derived a certain number of

*M. de Monthion, Chancellor of the Courte d'Artois, in a paper published in 1796, *Rapport à sa majesté Louis XVIII.*, commenced by declaring that if according to Mme. de Staël, there was no constitution in France, the revolution was justified, for every nation had a right to have a political constitution; but he tried to prove, against M. Calonne, that France had a constitution, which Mme. de Staël has refuted very thoroughly.

fixed and common principles, *e. g.*, the right to vote taxes, the principle of representation, more or less limited, the distribution of the powers of the State, the right of municipal and departmental representation, etc. Doubtless the application of these principles has been at certain epochs more or less fictitious; but this has been frequently the case in England, and yet we look up to and envy the English traditions. We must then believe that, notwithstanding so many revolutions, there have arisen in France since 1789 some germs of political tradition; but that in 1789 these germs did not exist, and that the result was to give them birth or new life, a thing impossible without a revolution.

(TO BE CONTINUED.)

APPRENTICESHIP — AND A BOY'S PROSPECT OF A LIVELIHOOD.*

AN apprentice, in common parlance, is a servant bound to work at a particular trade for a term of years, receiving payment partly in money, board, or clothing, and partly in instruction in the trade; his employer being also bound to provide these during the term of service. But the word means "a learner," simply, coming to us through the French *apprenti* from the Latin, and has its equivalent in the German "*Lehrbursch.*" As we shall see, it was long applied to students in all branches of knowledge. I shall use it with reference to learners of the manual arts, who, during the greater part of the time of which I shall speak, have been *bound* or *indentured* apprentices. I propose to trace the history of apprenticeship, to state its present condition, and the natural inferences from these as to its future.

Naturally, we should not look for the learners of arts but in those places or ages in which population has reached considerable density, and a demand exists for skilled labor. But when we turn to the civilized nations of antiquity, with whom these conditions are found, we discover nothing corresponding to the modern system of apprenticeship. There is no Greek or Latin word corresponding in meaning to that first given above of the word

* Read before the Philadelphia Branch of the American Social Science Association, at its meeting in March, by James S. Whitney.

"apprentice." The Roman law is silent with regard to those reciprocal duties of master and apprentice, which make so large a part of modern codes. The prevalence of slavery, and the division of the people into fixed social classes, account for this. The instinctive love of freedom provokes a scorn of all that is associated with its loss, and where the laborer is generally a slave it is not natural that children of free parents should enter into anything like a contract of servitude. I am not sure that modern society has yet altogether outgrown this feeling as to labor, originating in the slave-holding era of nearly all nations. There was besides no evident economic advantage in free labor. The hunter can provide game with less capital than the stock-raiser can furnish meat; and a slave, a perpetual minor, could be captured or bought, with a fair knowledge of an art, at less expense than a free youth could be maintained and taught. They whom the fortunes of war made slaves abroad had already, at home, following usually the trades of their fathers, qualified themselves for their future positions. Labor and obedience become hereditary wherever idleness and power become so; and if it be impossible for a lower class to pass into a higher, its members will naturally occupy among themselves similar relations, in successive generations.

It is therefore not until slavery and serfdom begin to disappear that apprenticeship arises in Europe. The hours of day number from midnight; and the shadows of the ancient order reach down through the twilight period of the modern era, to the times of Charlemagne. With the new growth of the arts, the Guilds of Crafts appear; not probably a revival of the Greek societies, or the Roman college of workmen, but, like the guilds for religious and other purposes, independent offshoots from the same root, the tendency to association for the common welfare, found in all the European races. The history of the guilds, interesting as it is in itself and in its relation to the history of social progress, is beyond our province to-night, further than in its connection with our subject. Of their *general* and *common* features, a very good idea will be given by the following example: the "Agreement of the Guilds of Exeter" (England), dating perhaps from a century before the Norman conquest. (*From Smith's History of English Guilds.*)

"This assembly was collected in Exeter, for the love of God, and for our soul's need, both in regard to our health of life here, and the after days which we desire for ourselves, by God's doom. Now we have agreed that our meeting shall be thrice in the twelve months; once at St. Michael's mass, the second time at St. Mary's mass, after mid-winter, and the third time at Allhallow mass-day after Easter. And let each gild-brother have two sesters of malt, and each young man one sester, and a sceat of honey. And let the mass-priest at each of our meetings sing two masses, one for living friends, the other for the departed; and each brother of common condition two psalters of psalms; one for the living and one for the dead. And at the death of a brother, each man six masses, or six psalters of psalms; and at a death each man five pence. And at a house burning each man one penny. And if any one neglect the day, for the first time three masses, for the second five, and at the third time let him have no favor, unless his neglect arose from sickness or his lord's need. And if any one neglect his contribution at the proper day, let him pay two-fold. And if any one of this brotherhood misgreet another, let him make boot (amends) with thirty pence. Now we pray, for the love of God, that every man hold this meeting rightly, as we rightly have agreed upon it. God help us thereunto."

The guilds formed for the protection of the inhabitants of towns from their feudal lords, in England from the seventh, in Germany from the ninth, and in France from the tenth century, including gradually all the citizens, and having obtained the royal sanction to ordinances framed for their own government, passed unnoticed into civic corporations.* In the eleventh and twelfth centuries they began to divide into their constituent elements. The trades of merchant and manufacturer, originally carried on by the same person, had become separated, the richer workman growing into the dealer; and the merchants now excluded from

* The connection of the town government with the guild throughout Europe is an inviting study. At least two writers, Thierry, in France, and Kemble, in England, have attributed to the latter the *origin* of towns in Northern France and in England. See Hallam, "State of Europe," 1, p. 349; and Brentano p. 105 (in Smith's "History of English Gilds"), as to the same connection in Germany. Dr. Brentano's Essay has been my chief authority for the history of guild's.

the guild the men "with dirty hands" or "blue nails," or who "hawked their wares in the street" (as the Danish, Belgian and German statutes declare), in short, the craftsmen and small dealers. With the government of the towns in their hands, the guilds, now become largely mercantile associations, were able to oppress these classes quite as notably as they defended the liberties of the town against the nobles. The result, of course, was the formation of guilds among the craftsmen, and struggles for political power between the old and new organizations, sometimes ending in a compromise, but generally in the supremacy of the workingmen, as the more numerous party, in the manufacturing towns at least.

Thus in Italy "the principal cities, and especially Milan, reached, before the middle of the 12th century, a degree of population very far beyond that of the capitals of the great kingdoms. Within their strong walls and deep trenches, and in the midst of their well-peopled streets, the industrious dwelt secure from the license of armed pillagers and the oppression of feudal tyrants. Artisans, whom the military land-holders contemned, acquired and deserved the right of bearing arms for their own and the public defense. Their occupations became liberal, because they were the foundation of their political franchises; the citizens were classed in companies according to their respective crafts, each of which had its tribune or standard-bearer (gonfalonier), at whose command, when any tumult arose, or enemy threatened, they united in arms to muster in the market-place." "The basis of the Florentine polity was a division of the citizens exercising commerce into their several *companies* or *arts*. These were at first twelve, seven called the greater arts, and five lesser; but the latter were gradually increased to fourteen. The seven greater arts were those of lawyers and notaries, of dealers in foreign cloth . . . of bankers or money changers, of woolen drapers, of physicians and druggists, of dealers in silk, and of furriers. The inferior arts were those of retailers of cloth, butchers, smiths, shoemakers and builders. This division, so far at least as regarded the greater arts, was as old as the beginning of the thirteenth century. But it was fully established, and rendered essential to the constitution in 1266. By the provisions made in that year, each of the seven greater arts have a council of its own, a chief magistrate or con-

sul who administered justice in civil causes to all members of his company, and a banneret (gonfalonier) or military officer, to whose standard they repaired, when any attempt was made to disturb the peace of the city." (Hallam, State of Europe, etc., vol. i, pp. 368, 419.)

In Germany, the low countries, and England, the guilds of the weavers, the first in time and in importance, were already strong in the eleventh and twelfth centuries. Craft-guilds arose generally throughout Europe from the beginning of the eleventh to the middle of the thirteenth century. By the fourteenth and fifteenth, subject of course to variation in different places and circumstances, they had almost everywhere, where they existed, obtained the control of the government of the towns, and their trade regulations had become municipal law. This result was not reached on the continent without bloody contests with the older or mercantile companies, and with the nobles or churchmen claiming jurisdiction in the cities. In England, as usual, the revolution was a more peaceful one. The kings usually sided with the rising power to check that of the nobility, receiving certain taxes in return for their aid. In fact, kings and nobles sometimes became honorary members of a guild.

The chief special function of a craft-guild was to regulate the manufacture of the articles produced by the craft. Their "laws of trade" were such in spirit and form as the following: All who carried on a trade in any place must belong to the guild of that trade. The wardens had the right "to examine all manufacturers, and to search for unlawful tools and products." "No member was allowed to possess tools, 'unless the same were testified to be good and honest,' and the statutes contained directions and prohibitions, entering into the most minute details, with reference to the method of working." "The punishments consisted in the payment of fines, or, in earlier times, of certain quantities of wax 'for the lights used in worship,' or of beer or wine to be drunk at their feasts." To enforce payment of dues or fines, the tools of delinquent members were sometimes taken away. "No one was admitted to any trade, or tolerated in it, whose moral conduct and honor were not stainless; no one, also, who had not proved himself a proper workman, and, therefore, *no one who had not served a regular apprenticeship.*"

It is at this point that this history connects itself with our subject. "The duration of this apprenticeship differed in different trades. In England it generally lasted seven years; in France, from three to four—sometimes six; in Germany, from two to four years. The admission of an apprentice was an act of special solemnity, corresponding to the important legal consequences it involved. As it was the beginning of a kind of novitiate to citizenship, it generally took place in the town hall, in the presence of the town authorities (in London, 'as late as 1869,' it is performed in the guild hall by the chamberlain of the city), or in solemn meeting of the craft-guild. On this occasion the apprentice was specially instructed in his duties, both as to his moral conduct and the trade. At last, a record of the act, the indenture, was drawn up, which also contained the special conditions under which the apprentice was placed with his master. By this admission the apprentice became a member of the family of his master, who instructed him in his trade, and who, like a father, had to watch over his morals, as well as his work, during his apprenticeship. At the expiration of his apprenticeship the lad (then a man) was received into the guild again with special forms and solemnities, *and became thereby a citizen of the town.* On both occasions a fee had to be paid.*

The number of servants (meaning helpers as well as trained workmen), and of apprentices, allowed each member, was often limited by the guild laws. Thus by the ordinances of the guild of the tailors of Exeter, which had been long founded in 1466; "Also hyt ys ordeyned, by the Master and Wardens and all the hole crafte, that fro henseforthe no man of the said crafte shall hold but iij [3] servantes and oo [1] pryntes at the most, w*t*owte lesanse of the Master and Wardensse for the tyme beyng, apon payne of xlti *s.* [40 shillings], and he that prayeth for hym that dothe ayenste this ordynance schal forfet xxti *s.* (20 shillings.)" As another specimen of these rules: "Also it ys ordeyned by the Master and Werdons and the craft forsayd, that every prentes of the sayd craft that is inrolled and trewly servethe his cownand (covenant), shall pay a spone of selver, wayyng a nonsse, *and the*

* Breutano, p. 129, etc. The title of master, as applied to a citizen (our *mister*), may have arisen from this connection of mastership in art with citizenship.

fassion, and shall elde a brekefast to the forsayde M. and Wardons, afore the day that he be abull to be made fre-man of the cite forsayd." (History of English Gilds.)

It was with such features that apprenticeship about the 14th century arose in Europe. The system formed in advance of governmental legislation, a natural outgrowth of the social state, was exactly suited to the condition of the times. There was, with the exception of the Belgian clothiers, no large "working class" in the modern sense, and no capitalist employers. The apprentice was often the only helper of his master, and when free, soon took his apprentice and carried on his craft for himself. Of course it was easier to find apprentices than workmen. But it was a system that made good workmen and good citizens. It is to its existence that we owe such tales, homespun as they seem, as Hogarth's "Industrious and Idle Apprentice" illustrates such stories, "true or well found," as of the exploits of the "Prentes Boys of London," who had their trainbands in the civil wars, and sent successful memorials to Parliament. As the business of a master increased, "servants" or workmen who had not served an apprenticeship were employed, but it was forbidden to "teach them the craft as one would his apprentice." Many of the latter class were of distinguished parentage, and many, who were not, gained it for their children, by honorably reaching and filling high public office. The name of "apprentice" was an honorable one. Benchers in the Inns of Court (in England), now called Barristers, were styled, until near the close of the 16th century, "Apprentices of the Law." The incorporated trades, or guilds, were called "universities." "The university of smiths, or of tailors," etc., are expressions which we commonly meet with in the old charters of ancient towns. When those which are now called peculiarly 'universities' were first established, the term of years "which it was necessary to study in order to obtain the degree of master of arts, appears evidently to have been copied from the term of apprenticeship in common trades, of which the incorporations were much more ancient. As to have wrought seven years under a master properly qualified was necessary to entitle any person to become a master and to have himself apprentices in a trade, so to have studied seven years under a master properly qualified was necessary to entitle him to become a master, *i. e.*, teacher or doctor,

(synonymous words) in the liberal arts, and to have scholars or apprentices (words also synonymous), under him." (Encycl. Britt).

But the same process of elevation—of the lower social elements to a higher level—which had originated the craft-guilds, wrought their destruction also when they had peformed their work. Milman (*History of Latin Christianity*) points out "the hereditary tendency" under the feudal system, "of everything, from the throne to the meanest trade. The son followed the trade, and succeeded to the tools, the skill of his parent." It was natural that guild members should extend special privileges to their sons, as in France, where a son, living in his father's house till seventeen years old, was considered to have served an apprenticeship to his trade. Such practices, with the accumulation of wealth in successive generations, gradually made the guilds close corporations of capitalists. The workingmen employed, as a result of this, in large numbers, by an individual or company, began to form a distinct class. These men, not able to employ capital or labor, excluded from and oppressed by the guilds, as *all* craftmen had formerly been by the merchants, made, in self-defense, associations among themselves, the direct ancestors of the modern trades-unions. Here we have the beginning of the present factitious antagonism of capital and labor. From the close of the 14th century we find throughout Europe statutes to protect the workmen from the corporations. Fronde (*History of England*) tells us that, in 1531, "the craft wardens of the various fellowships, 'out of sinister mind and purpose,' were levying excessive fees on the admission of apprentices, and when Parliament interfered to bring them to order, they 'compassed and practiced by cantill and subtle means, to delude the good and wholesome statutes passed for remedy.'" In the reign of Queen Mary of England it was enacted, on the ground that "the rich clothiers do oppress the weavers" (by the possession of greater facilities) "that no clothier shall keep more than two looms, nor more than two apprentices, etc." It will be seen that while the employer in one view of his interest wished to restrict the number of learners of his trade, in another he was glad to avail himself of the cheap labor they supplied. But all legislation, on either side, became a dead letter before the power of capital wielded by in-

dividuals and companies outside of either party, and assisted by new mechanical and chemical appliances; and while the guilds linger in England in the vague form of "Liveried Companies," maintaining their existence by an annual dinner, in France they perished, with all that was oppressive, in the first Revolution, and in Germany have been gradually legislated out of being.

With their decay began the decay of apprenticeship. The concentration of large numbers of workmen in one establishment made it impossible for the employer to oversee, as formerly, the entire life of the apprentice. The growth of democratic principles weakened the habit of subordination and the principle of reverence; the quickened social and mercantile life threw before all classes greater opportunities of sudden wealth; the *Ars longa, vita brevis* of older times, which has been the foundation of much good work, was practically rendered, "Life is short, and to learn well an art takes too long;" and so the old apprenticeship began to die with the guilds of which it was the flower and fruit. But the ripened seed has remained, and from *its* present decay we hope to show that there may arise a new and more vigorous plant.

So far as apprenticeship exists, it retains the features due to the origin we have described. The laws of the State, or the present customs respecting it, are borrowed from or founded on the earlier ones framed by the guilds. By the "statute of apprenticeship" (1563) no person was allowed to carry on any "trade, craft, or mystery" then used in England, "unless he had previously served to it an apprenticeship of seven years at least,"* which had long been a by-law of many corporations. It was also provided that only those youths might be taken whose parents possessed a certain fortune. Whoever had three apprentices must keep one ourneyman, and for every additional apprentice, another jour-

*Under this law the English Courts have ruled "that a coachmaker can neither himself make, nor employ journeymen to make his coach wheels, but must buy them of a master wheelwright; this latter trade having been exercised in England before the 5th of Elizabeth (1563). But a wheelwright, though he has not served an apprenticeship to a coachmaker, may either himself make or employ a journeyman to make coaches, the trade of a coachmaker not being within the statute, because not exercised in England at the time it was made." (Encycl. Britt.) The absurdities to which such laws lead are well illustrated by this extract.

neyman. (By other laws, the number of apprentices in certain trades, was restricted absolutely, without regard to the number of journeymen.) Fees, varying from one pound to fifty pounds were required at the signing of indentures, and were taxed by the government. Overseers of the poor, with the consent of two justices, could bind the children of those unable to pay the fees, and tradesmen, husbandmen and gentlemen were obliged to take them. The prohibition as to carrying on trade without having been an apprentice, and some of the other features of this law, were repealed in 1814, at the petition of employees, after having long been evaded practically, and been the occasion of many disputes. Apprenticeship is now entered into in Great Britain as here, as a voluntary contract, subject to laws similar to ours. In Scotland there is no law regulating the term of service; three years is a common term, and both there and in Ireland apprenticeship has never been much restricted by law. In Germany the apprentice serves from three to five years, paying a larger fee for a shorter term. In case of a three year's service, at least among machinists, he pays his own board. In all cases he furnishes his own bed, which becomes his master's property at the expiration of the time. Before beginning business for themselves, the rule has prevailed, since the sixteenth century, that freed apprentices shall travel for three years, working at their trade in different cities, under the general name of *Gesellen*. In France, similar customs prevail; the time of service is from three to eight years, and of *compagnonage* (answering to *gesellenschaft* or *fellowship*) five years. Before being permitted to carry on his craft as a master, the workman, after the fifteenth century, was obliged to execute and exhibit for the approval of the Master and Wardens a "*chef d'œuvre*," or master-work. This rule became obsolete in Germany, and I believe in France, about twenty-five years ago. In both countries both law and custom are gradually relaxing to the looseness of ours. Indentures are not required by law in France, Italy or Switzerland. In Italy, the practice is similar to the English, and both there and in Switzerland apprenticeship is a voluntary matter throughout. In the United States, until twenty or thirty years ago, up to which time apprenticeship was more common than now, the boy received, during his whole term of service (from five to seven years) besides his board and cloth-

ing, and a suit of clothes at the end, as in Europe, twenty-five or thirty dollars yearly. But since the time referred to in this country, apprentices receive wages in lieu of and equal to board, for the first year, advancing by about fifty cents or a dollar per week, in successive years. One of the last legislative acts in this State on this subject shows how loose the practice had become in 1865, when it was enacted that no apprenticeship should be void on account of the want of indentures, if a contract could be proved otherwise.

Our review has brought us to our own time and country. It has shown the history of the system by which the artisans have been formed who have accomplished all that civilization displays of material achievment in the Christian era. But if it be now falling into disuse, is it because there is no more need of such men, or because they are furnished by some other agency? A moment's consideration of the mechanical work which this generation is undertaking will compel us to admit that its performance requires at least as highly skilled labor as that of our ancestors. There is, no doubt, place for such men. "But do they come when we call?" Is there not a general complaint of the want of thoroughly well skilled labor? The high price of many articles made in this country, as compared with those of foreign manufacture, is often said to be due to the scarcity of labor. What do we mean by this? Step with me into any one of our large factories, on any morning, in almost any season, and wait an hour in the office. It will be unusual if in that time there do not enter at intervals three or four sturdy men, asking, as they who ask favors, "Is there any chance for a man to get a job of work here?" "What is your trade?" "I've no trade—I'm looking for laboring work." "No, —we're full to-day." There is another class of applicants, who also have no trade, so to speak; men bred to the labor of the overcrowded counting-house and forced out at the slightest mercantile panic, to ask for anything they can do in the workshop. And we talk of the scarcity of labor! It is the scarcity of men *trained to do well what is wanted*, that we mean. Ah, these men that can only help, or that can do a little of anything, are very often burdens, instead of help to the community. Those men who walk away so dejected or so indifferent—thinking, perhaps, how much longer they can put off the landlord, or get credit at the

store, or hardened into carelessness as to either, are as much *men*, and as naturally capable of work as the mechanic whom the foreman *sent for* that morning. So have we seen armies of thousands, but with "plentiful lack" of soldiers. Suppose the proportions of the two classes of workmen were more equal, would there not be an equalization of wages, and a more frequent substitution of machinery for simple animal force, that would lessen the cost of production, and feed and clothe a far greater number than now?

The simple fact, then, of the existence of a large mass of unskilled labor, while skilled labor almost commands its price, shows that there are material and room for a large increase of the latter. But by what agency is this increase to be made—nay, by what agency is the present number of skilled craftmen to be kept up? There is none but the system of apprenticeship, falling more and more into neglect though it be.

I have not been able to obtain the number of learners of the different trades in this city, which, as a large manufacturing one, will illustrate well the subject, but the following figures will throw some light on this inquiry:

The number of men and women employed in the manufacturies of this city in 1870, as carefully collected by Lorin Blodget, was 127,590, of which the men are 72 per cent. The total number of "youths" employed was 10,286; and supposing the boys to be in the proportion of 60 per cent., there will be 6,172 of them. Of these a very large number are children below the age of 16, the lowest age of apprentices, and many are not in any sense apprentices, so that the male "learners of trades" must be expressed by a much smaller number. The census report gives 5,832 as the "total number of apprentices," boys and girls, which no doubt includes many besides apprentices proper, while it is not likely to omit many of them. Taking the boys at 60 per cent., we have 3,500 as the extreme number of male apprentices in this city in 1870. There are about 8,000 establishments in which men and boys are employed, and 92,112 workingmen in shops. The apprentices, therefore, cannot exceed the proportion of 1 to every 2¼ shops, and to every 26 workmen—a proportion not equal to the requirements of the guilds, or the allowance of the trades unions. As the number of boys between the ages of 16 and 21 must be at least 25,000, of whom not over 3,000 are

in school or college, it would seem that the small number of apprentices cannot be due to a deficiency of material.

But why do the boys learn trades? That is a question which brings us to the heart of our subject. In the first place, boys are human; and in the second place, they are boys unfortunately, their parents are human, too, and the natural indisposition to hard work, and preference for clean hands and clothes, is not always discouraged by parental ambition. The class of whom this may be said, though it may need it more, deserves not so much our sympathy as another, where ambition or necessity obliges the father to foergo some of this indulgence, that the son may aid him in the support of the family, or be fitted to maintain another. Perhaps it is a mother, alone, but for the boy who is forced into the unnatural position of his parent's adviser, in deciding the momentous question of a trade. There are long discussions as to whether the family purse can bear the strain of the first two or three years, while the boy earns only his own board; and all choice must often be subordinated to the necessity of taking the trade which pays best and soonest. The first decision is perhaps for that of a machinist, which seems to have a great attraction for most boys. Yes, and our hero finds on the books of the larger establishments to which he first applies forty or fifty names already entered, waiting their turn. He cannot wait six months or a year, besides he finds that in the large shops frequently a boy works during his whole term on a few machines, and does not learn the whole "handcraft." He goes to the smaller shops where the applicants are fewer, but the vacancies are fewer still. He asks a neighboring carpenter and builder for a place. But this trade does not take to boys. The work is all prepared in mills, by men who have learned carpentering in the old times, or who have learned to attend a single machine, and there is nothing for a boy to do. He may not be strong enough for blacksmithing, and there are few boys wanted in the shops where general work is done, as the steam hammer can be both boy and man.

The bricklayers also seem "not to approve of boys"—as the master can oversee them but little, from the nature of the employment; bad work is a serious thing to remedy; and the contract system of building requires great economy and dispatch only. Boys who can stand hard work, too, need apply. With both

bricklayers and plasterers there is a prejudice against boys, as so many unfaithful learners have brought discredit on the name. He asks to be a moulder; there is a better opening here, and the wages are good—beginning with $3.50 or $4.00 per week—but almost anywhere, but in this city, (and here, too, until a few years ago), the Union tells him that they allow but one apprentice to every ten men in a shop, after the one to which each shop is entitled. One here has another rebuff from this source, when he asks to learn the art of printing. A rule of the Union declares that no member shall work in any *newspaper* office employing an apprentice, and allows in other offices only one apprentice to every five men, after the one to which each office is entitled. Repressing his ambition for the constructive arts, and that preservative of all others, one lad would be a tailor, or shoemaker. But scarcely any one will take apprentices at these trades. I am told that it is doubtful whether there is in this city an apprentice in the former—and that there are probably not over a dozen shops employing them in the latter. The work among tailors is done by men, mostly of foreign birth, each employing a female helper or two. But the best of the "foreign talent" does not immigrate, for of the 3,000 sewing tailors in the city, only about 300 are capable of the finest work. Notwithstanding the lack of learners among shoemakers, however, their Union forbids the employment in the shoe factories (where wages of $25 per week are often made, and the greater part of the shoes for city and country trade) of any but those who have learned the art, at least so as to be able to make in some sort a shoe. Of course, the supply must be kept up by importation, or by half-educated home-learners tempted by the high wages—to work a year or two at the bench as apprentices. The bricklayer's and plasterer's Unions, too, have their restrictive rules, but they are not now enforced. The hatters have theirs and nforce them, I believe.

You will be as weary as our hero with further illustrations of this part of my subject. It is sufficient to so say that in the majority of cases the boy is forced by necessity, or drawn by the prospect of greater immediate wages, to work in a bolt or umbrella factory, a type foundry or some such establishment, where he is paid "by the piece," and can earn five or six dollars, or more, per week. He becomes a man, but he cannot maintain a

family even on wages that allowed him to dress showily when off work; he has learned no trade that will bring him more; and is obliged to give place to another generation of boys glad to take what he has outgrown. He becomes in a small way an adventurer, seeking for pay that represents an education which he has not; and often swells the number of incompetent artisans, a "dangerous class" who do our poor work of various kinds.

We have supposed the case of a boy who wishes, or whose parents wish him, to learn a trade. But what of that large class not above the necessity of labor, and who have no one who will or can procure them places? There are about five thousand of them here, enough to form at least the nucleus of a still more dangerous class. Many of these, through a kind Providence, and some act of their own or their parents, find their way to the House of Refuge, or they are taken into some "Home," whence they are provided with places to learn trades, or at least make a living. But let no boy, disheartened in his efforts to find such a place, look with jealous eye on the graduates of the House of Refuge. Few of them are apprenticed to handicrafts, the wages of which rapidly supply the place of capital. Out of thirty-nine boys indentured in 1870, twenty-seven were placed with farmers and ten were divided among seven trades. Out of forty in 1871, twenty-six went to farmers and eleven to nine trades. The balance in each year went to occupations other than trades.

We have looked at this matter chiefly as regards the boys' interest. But it has a larger, a national aspect. The scarcity of skilled labor is a direct law of productive power, and so far a national waste. The truest capital of a country is its labor, and the standard of its value rises in proportion to its skill. That is a well-ordered household where every member contributes something to the common happiness. That is a well-ordered industrial establishment where the labor of every employee is economized. A nation partakes of the social and productive characteristics of both these organizations. In this audience, surely it is not necessary to refer to the objection that an increase of producers will lessen wages, further than to say that it lessens also the cost of all that is produced, and so makes small wages go further. Besides, I am speaking of a *change* of a multitude of almost non-producers into producers; not of an addition to the

population. And all this superabundant power is animal, not simply material, and requires to be fed, clothed and housed; so that the comparatively few competent workmen must earn enough not only for their own, but to aid in the support, in various ways, of their untaught and low-paid brethren.

In whatever way, therefore, we regard it, the evil is a serious one. No class is more fully sensible of this than workingmen, now employers, who served their apprenticeship twenty or thirty years ago, when indentures were more frequently made and respected. These say that they do not see where the skilled workers of the future are to come from. This is specially true of the trades where manual skill and strength have not been replaced by machinery. The boys who generally offer themselves for these are not such as employers feel safe in accepting. At present we obtain a large number of mechanics by immigration. Of 17,857 male immigrants for whom the labor bureau at Castle Garden, New York, found places in 1870, 3,186, say one-sixth, were mechanics. Almost all of these were settled in New York city, or its neighborhood. The trades chiefly represented were: shoemakers, 345; tailors, 315; cabinetmakers, 371; making about one-third of the whole. No doubt, of the large number not helped by this agency, many were also mechanics, and of sufficient means to be able to dispense with aid. But the same causes are at work abroad as here, as we have shown, to lower the standard of good work; and there may come a time when the student of social elegance as well as of social science may have as much reason to complain of the quality as of the price of his coat and his boots.

In what direction shall we look for a remedy for all this? To the laws of supply and demand? But these laws, if any, have superseded during the last fifty years the old apprentice laws, and to this pass are we come. The laws of Nature are blind forces, bringing good out of evil eventually, in their own destructive way, if man is incapable of utilizing them. But it is his province to study, to obey, and so to direct them, in political economy as well as in physics. The operation of the laws of trade cannot be prevented by combinations on any side, but great suffering may be avoided if a conflict is evaded. The progress of a locomotive is not stopped by a flock of sheep grazing by the track; but it is

undoubtedly better, for the engine as well as for the sheep, that some one should foresee the animals' propensity, and take the proper measures to keep them out of the way. To leave this matter to regulate itself is to leave it to the contending interests of employees and employed, which had so large a share in the breaking up of the old system. I do not enlarge upon the laws of the trade unions, because they are only a feature of this struggle. They are the narrow, but natural expression of the supposed interests of one class, in opposition to movements sometimes similar, sometimes supposed to be so, of the other. The boys, for whom I speak to-night, are in the interest of neither party, and of both; they are the children of the employer as well as of the workman, and may grow up interchangeably into either. And in their name I ask, Where is the larger spirit to which they may appeal from the three obstacles—themselves, the workman and the employer—blocking the door to apprenticeship and self-maintenance?

To whom can they appeal but to the citizens—which the man, of either class, is, and the boy is to be? In the community of interests which citizenship represents, *all* interests are harmonized. Let us turn again to our history. It was the common municipal interest in the guilds, which found them and made their rules law. The world has outgrown their system, but it can never outgrow the spirit that devised it, and that is illustrated in the works achieved under it. The state into which the old guilds grew up and dissolved, is their true successor; and though she may easily, in the confusion of a transition period, have failed to realize her inheritance, or to wield with adequate intelligence and firmness her all-pervading power, she has not renounced them. It is *her* function to control this matter of apprenticeship, the key, nay, the door itself, of the labor question.

It may be said that the less the government interferes with labor the better—and why should it concern itself to find work for children rather than any other class? It might be answered, because they *are* children; but I prefer to rest my plea on the broader ground that this is not in itself a question of labor, but of education. What is education? Is it not a development of all the powers, so that that class or that one which best represents its possessor, may, by a sort of "natural selection," obtain its best

sphere of action? This is not accomplised where all lads are taught only such knowledge as prepares them to enter the counting-house, the scientific school, or the learned professions. I would have our public schools give to their pupils such a knowledge of tools, and of the simpler processes of the manual arts, that a boy could enter upon these on the same footing that he could obtain a clerkship in a store, receiving wages that will enable him to form at once the habit of accumulation, because he will be of value to his employer from the beginning. Where there should be no necessity for immediate entrance on labor, a taste formed in the rudimentary school could be cultivated in higher technical schools, controlled or aided by government.

The subdivision of old trades into specialties, which grow into new trades, and the increased use of machinery, are arguments even better than Dr. Adam Smith's, a century ago, against long apprenticeship; and the same degree of skill can be gained in less time, where to learn and to teach are the ends, than where the labor is a matter of wages, and learning an incident. This instruction in handicraft would not conflict with that in letters. It is found in England that children employed in factories and receiving school instruction alternately are better scholars as well as better workers. It is well known that our country schools, kept through the winter only, and made up of boys who work on farms during the summer, will compare favorably with city schools, whose only recess is a long holiday. The training of the eye and the hand by drawing, measuring, handling forms and materials, cannot but have a beneficial reaction on the mind; and the learning how to *work*, which is something different from bodily *exercise*, is a most desirable preparation for any position in life.

There was a time when an artisan who could no more than read and write was an exception. To extend the limits of the learning that comes from books among workingmen was the first object of the public school. It has achieved the object; but those whom it reaches do not remain of the class of workingmen. This is not stated as an objection to the system, yet if among the thousands of workmen's children who are its subjects a small minority become skilled artisans, there is certainly a want left unsupplied, if not created; and a fear may be expressed that the community is being educated away from labor. Out of 52 lads graduating

from the Philadelphia Central High School in 1848, but 7 were engaged in mechanical employments some fourteen years afterwards. Out of 38 graduating in 1867, 21 became clerks, 6 salesmen, and 4 mechanics. Of 54 graduating in 1856, 30 became clerks and salesmen, and 11 mechanics. In each case, the total number includes all of whom any record could be made. The usual graduating age is about 17 years. It may be said that the pupils of the high school are not generally from the working class; but employers say that when they served their time, apprentices come very largely from the class corresponding to that whose sons graduate from the high school. The statistics of Girard College may be expected to be different, but of the 221 former pupils who were apprentices on Dec. 31st last, about one-half only, including 26 printers, engravers, etc., were learning mechanical trades. Human progress is always by exaggerated and reactive movements; and it may be that the time had come to revert to the instruction in labor of those who formerly had little other instruction. It is certainly too late to say that government has nothing to do with education. That point has been fixed, and we are passing on to another. It will soon be too late, we hope, to say that government has nothing to do with education, further than parents desire. And certainly education will not need to be any the more "compulsory" when it holds out the prospect of a trade as well as of books.

It is too late, too, to say that the teaching of trades in schools is a new and untried notion. Industrial and technical schools, in Germany and France, have shown that it is practicable to instruct youths in this way in the manual arts, as well as polytechnic schools, here and abroad, can teach them the applied sciences. And even at home the principle of combining the study of letters and of handicrafts is illustrated in our reform schools, and in some of our benevolent institutions. Why should the State forbear to do that preventively which she does, to some extent, punitively? Why should not the children who have their natural protectors be, at least, as well provided for as those who have lost them?

I do not propose to dwell upon the details of this suggestion. My object will have been accomplished if it be fairly realized that apprenticeship, as our fathers knew it, is dying, and natu-

rally; that it belongs to a state of society which will probably never return, and that to lament its decay is as absurd as to mourn for the middle ages; yet, that the want which it supplied is more imperative than ever, and that there is no power but the State itself—the true guild—that can build anew and on broader foundations the complete system of learning—the true apprenticeship.

NEW BOOKS.

Henry Carey Baird & Co. send us E. Reshine Smith's MANUAL OF POLITCAL ECONOMY. The book has long been a favorite manual of ours, and we regard it as, in many respects, the best summary of the subject that has been produced. Of all the followers of Mr. Carey, Mr. Smith writes with most of systematic method and scientific form. He presses these qualities to a point that his master would perhaps consider unwarranted by the character of the subject. His work is the product of original thought and study in many departments. His chapter on the "Formation of Soils" is one of especial interest and originality. Mr. Smith has recently accepted a post of responsibility and honor in the employ of the Japanese Empire. We accept this new edition of his work (with a full index) as a parting gift to his countrymen. The publishers will send it (278 pages) for $1.25 to any part of the United States.

The same house send us THREE CENTURIES OF ENGLISH LITERATURE, by Charles Duke Yonge. Mr. Yonge, who is a Professor in Queen's College, Belfast, looks at English literature from a point of view more common twenty years ago than at present. He begins his survey of the literature with Shakespeare, and brings it down to the present, not in a strictly chronological order, but discussing each branch of the literature by itself. Thus in chapters V.–IX. he discusses the historians—from Clarendon to Grote. He has evidently paid considerable attention to good critical writers and often followed their guidance, but we sometimes meet in his pages judgments which sound Philistinish and even "provincial." What shall we say of a writer who finds the chief interest of Coleridge *Christable*, in its having suggested to Scott the meter of the *Lay of the Last Minstrel*, or speaks of Shelley as a genius inferior to Byron, and omits Burns, Cowper and Crabbe from the list of poets, and Edward Irving from that of the preachers. English literature has yet to wait for a native Gervinus.

Rev. John Hunt, whose *Essay on Pantheism*, excited a good deal of notice some few years ago, seems to have given up his purpose to write a series of works on the history of "Isms." At any rate he is now writing a work of much greater value and interest—A HISTORY OF RELIGIOUS THOUGHT IN ENGLAND FROM THE REFORMATION TO THE END OF LAST CENTURY. It is strange that no such work has ever been attempted before (excepting the imperfect sketch by J. J. Tayler) and that English theology has been so deficient in works in this department. The author's own views might be easily learned from the first two volumes, which reach from the times of Sir Thos. More to 1720. But he is always carefully and rigidly impartial in his presentation of opinions. The book is full of curious and interesting matter, and is of great interest to those who are not professional theologians. We shall be greatly mistaken if some of the facts he unearths are not made use of in coming controversies. Strahan & Co. are the publishers.

ERRATA.

MAY NUMBER, 1872.

Page 222, last line, for "management" read arrangement.

Page 224, line 4, for "germs" read genus.

Page 224, line 23, omit "them."

Page 226. for *Entaenia, Butes, Choraphilus, Phatoginis, Amiqus* read *Entænia, Buteo, Corophilus, Photogenis* and *Amiurus.*

Page 227, 3d line from bottom, period after "species," and for "as" read As.

Page 227, 2d line from bottom, read for "available" a variable.

Page 228, at top, for "for" read of.

Page 231, line 14, for *Klein* read *Kein.*

Page 232, for "prominent" read permanent.

Page 232, 4th line from bottom, for "developed" read developes.

Page 235, for *appella* read *apella.*

Page 235, line 12, for "a usually" read an unusually.

Page 235, line 28, for "*capuchinus*" read *capucinus.*

JULY NUMBER, 1872.

Page 382, line 12, for "primatively" read palmately.

Page 383, line 14, for "ceaces" read ceases.

Page 384, bottom line, for "atonic" read atomic.

Page 385, fourth line from bottom, for "Jas." read John.

AUGUST NUMBER, 1872.

Page 429, line 7, insert a period after "beings."

Page 437, line 21, for "mans" read its.

SEPTEMBER NUMBER, 1872.

Page 467, line 12, insert comma after "itself."

Page 469, line 3, for "the" read their.

Page 469, line 22, for "inflaming" read influence.

Page 470, line 23, for "coincided" read coincides.

Page 470, line 24, after "awakened" insert in others.

Page 471, line 14, after "in" read human.

Page 472, line 30, for "from life unto death" read from death unto life.